

1- Transformer Types

أنواع المحولات

1.1 Definition:

Transformers :transfer electrical energy at system voltage to electrical energy at the required voltage or higher voltage.

1.2 Types of transformers

•Distribution transformers:-

- Oil – immersed transformers
- Askarel immersed transformers
- Dry type transformers

•Instrument transformer

- Current transformers
- Voltage transformers

1.2.1 Oil immersed transformers :

Oil immersed transformers have their cores & windings immersed in mineral oil.



1.2.2 Askarel immersed transformers

Askarel Oil immersed transformers have their cores and winding immersed in the synthetic cooling & insulating fluid Askarel normally .

These transformers referred to under the trade name of the fluid , e.g “ colophon – immersed transformers “ or “ Pyroclor/Aroclor immersed transformers”

Askarel is a colourless , flame – resistant & explosion proof fluid , it is made of chlorinated aromatic hydrocarbons . this density is approx. 1.569 cm at 15.5 C° ambient temperature .

The electrical properties are a good as these of mineral oil (transformer oil) but Askarel – immersed transformers can be installed without special measures of fire protection .

For chemical reasons , mineral transformer oil & Askarel must not be mixed .

An oil immersed transformer cannot therefore be refilled with Askarel or an Askarel immersed transformer be refilled with oil .



1.2.3 Dry type transformers:

Dry type transformers have no insulating & cooling fluid they are designed according to the type of insulation of the windings into varnish – insulated & silicon insulated dry type transformers.

Self Cooling :

Distribution transformers are mainly manufactured with self cooling , with this kind of cooling the heat generated is dissipated by the natural air flow and by radiation .

With forced air cooling the cooling air is circulated by fans . subsequent addition of fans to the transformer is only possible after consulting the manufacturer .

The limits of temperature rise permitted for various insulating materials are specified in (VDE-0532) and these are based on the following limits of cooling air temperature : -

- Maximum temperature of air 40h C .
- Daily mean temperature of the air 30h C .
- Yearly mean temperature of the air 20h C .

The temperature of the ambient air is measured at a distance of 1-2 m from the transformer .



1.2.4 Instrument transformers :

- Current transformers
- Voltage transformers

•Current transformers:

Current transformer is transformer with small rate power (burden) , whose primary windings are in series with the line circuit , and secondary windings are connected to measuring instruments , electricity meters relays or control devices , current transformers isolate the measuring of protection circuits from the primary voltage and also protect the apparatus corresponding to the over current response of the current .

1.2.5 Voltage transformers :

Voltage transformers are also of small power rate and operate at almost no – load . they isolate the primary high voltage from the connected measuring or protected circuits.

